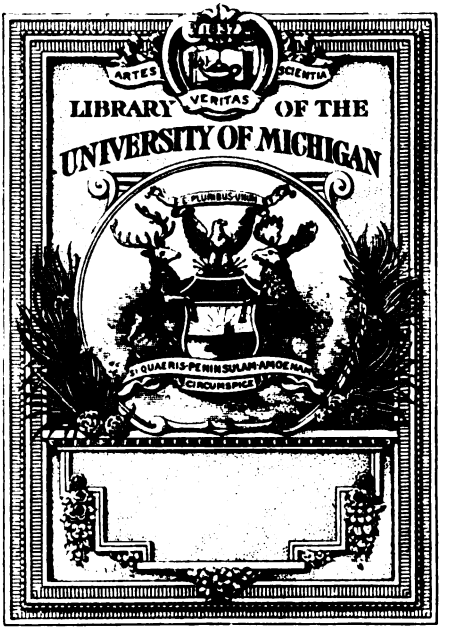
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EARTHQUAKES

THEIR ORIGIN AND PHENOMENA.

By GEORGE WALTER HALE.

Dear Sir :

The discoverer takes the liberty herewith, to hand you a brief explanation of the origin and phenomena of earthquakes, a matter hitherto unknown and now first made public.

Extraordinary and incredible as it may seem, it will be found correct and a little reading, along the lines indicated, should convince the reasoner, as to such origin, though the phenomenal conditions are more difficult.

As this force will ultimately be found the source of all conditions, throughout the Universe, the importance of such discovery cannot readily be estimated.

Trusting that all Americans will take pride in the tremendous addition that our country, is thus enabled to give scientific knowledge, I remain,

Yours respectfully,

GEORGE WALTER HALE.

Deadwood. So. Dak.. U. S. A.

Kindly acknowledge receipt. Copies $1.00

EARTHQUAKES

THEIR ORIGIN

AND PHENOMENA.

By GEORGE WALTER HALE.

EARTHQUAKES, THEIR ORIGIN AND PHENOMENA.

CAUSED BY IMPACT OF GIGANTIC COMET-METEORS THAT FALL TO THE EARTH VERTICALLY.

(By George Walter Hale.)

CHAPTER I.—EFFECTS UPON THE EARTH.

No one seems to know what earthquake phenomena is like, no one reads it. It is so strange and inscrutably wonderful that one does not know what it means, when he does read it; for it is absolutely mysterious and unaccountable. Modern science has long ago abandoned it as hopeless and many refuse to believe the things, that successive generations of men, have recorded over and over again, of this phenomena. The writer discovered its true source, years ago, but it has required years to unravel and place it before the reader, with any positive assurance and this largely because, ignorant of its origin, the accounts are so confusing and imperfect.

The above caption, will doubtless be received by many with surprise and incredulity, yet it will be remembered that nearly every great physicist, who has touched upon the subject of late years has suggested that the earth is made up of the debris of comets and meteors. Mr. Russell, a late writer upon lakes, assigns as their origin, earthquakes and meteors. Here the writer has advanced one long step further and shows you that earthquakes are caused by meteors, and any reader who wishes to inform himself, may by means of what is given herewith, assure himself of such fact.

It is not the purpose of the writer to demonstrate matters fully herein, as the reader may do that, but to inform those residing on earthquake belts of the true cause of the phenomena, to describe and explain it briefly, in order that more careful observations may be made of phenomena, as it has been presented in the past or may be noted in the future. Through ignorance of such origin, there is no account of any earthquake, that does not leave much further information to be desired and far more watchful, accurate and intelligent observations.

Science at the present time, knows nothing of this origin and assumes from Mallet, that all phenomena, proceeds from the earth, but it accounts for and explains nothing and its assumptions are curiously confusing. The more wonderful of

this phenomena is not published by writers in English, because Mallet said: "It is too remarkable to publish." We are forced therefore to turn to single accounts to continental writers, such as Boscowitz and even to Mallet's catalogue, for he did not entirely omit this remarkable phenomena.

The reader will be still more surprised to learn how very important this matter is, for he will soon learn that the meteor is the real source of all phenomena, that it is the supreme force that actuates the universe.

We will first examine the effects produced upon the earth and though these are quite unexplainable from any other theory, we will then take up the aerial conditions which have become almost "tabu" with scientific students, who limit themselves to seismic activity, accepting the statements of others as to earth movements, but refusing to believe them, as to many other conditions, the existence of which they dare not dispute.

Should the writer in making these explanations briefly as possible, seem didactic, in his statements, he craves the forbearance of the reader, for it is an old story, that the writer has proven over and over, and it will be learned on careful and a comparative study of it all, profound and difficult as it is, that the writer has made few mistakes.

There are two kinds of so-called earthquakes, one being a slow secondary movement of the earth, caused by steam and gases generated by the body after it is seated in the earth, which adjusts itself by slipping, etc.

The other is due directly to meteor impact, and the phenomena attending it is most wonderful, while none at all attends the former.

Science has never learned to distinguish between the two, yet those who dwell upon earthquake belts readily perceive this difference, paying no heed to the one, they run screaming from their houses when the meteor comes, crying, "terremoto," "earth removing shock," the secondary they term, "temblore." (trembling.)

Aside from the active phenomena, let us glance at conditions as we find them; for instance, we find the moon shot full of great oval and round cavities, which many now ascribe to meteors, and if we examine the lacustrine regions of the earth, we find it here filled with oval and variously shaped craters also, but they are filled with water and called lakes. The moon unlike the earth is frozen solid and retains the impress while the water and sediment in the earth with other causes to be mentioned, fills and changes many lake cavities.

All true lakes are formed thus as Mr. Russell has sug-

gested and thousands of them have been formed by earthquakes during historical times; at Calabria, Mr. Lyell states, 215 lakes were formed by one great earthquake. This because these bodies like the comets are broken up and segregated, so that they may fall singly, or in twoes, threes, in clusters, or in showers, as at Jamaica.

The reader must not confuse these enormous chasms formed by meteors with the narrow crevices that open upon the crest of earthwaves, as the waves pass through the earth, which always close when the earth assumes its level; while in rock substrata the chasms remain open and fill with water to the water level of the earth, but in alluvium, unless very large these chasms close also, in whole or part leaving no chasm.

A corresponding upheaval always attends the formation of a lake, and this upheaval may be widely distributed, so as not to be noticed, save near water levels, where the uprise of a shore at once shows the upheaval, as mentioned by Darwin at Conception, or again the upthrust takes place through some former lake or cavity as at the formation of Lake Biva, Japan, when the deified mountain FusiYama rose twelve thousand feet in the air. This upthrust attends all great shocks and Mont Blanc, near Lake Geneva, has a lake bed upon its crest. These effects are curiously varied and all the lakes of Europe were strangely agitated when the great shock of Lisbon came, though in many cases no movement is felt on the shores. Lake Ontario is said to have risen six feet at this time. Thus we may know that lake beds are much deeper than their apparent bottoms. At Lisbon also the larger body fell first far out at sea and the people ran down upon a wharf, to escape the falling buildings, when in the twinkling of an eye another body fell on the wharf and boats surrounding it, and all, including some five thousand people, instantly disappeared, leaving a chasm 2,400 feet deep. The Tagus formed a vortex and filled the circular chasm, but no boat, hat, or vestige of anything that went down, ever rose to the surface of the water, a condition ever regarded as unaccountable, but not so now. An upheaval or upthrust took place in a lake near, whioh had its bed pushed up by the pressure, its waters ran out and it remained dry land. This movement of the earth in two directions at the same time is equally unaccountable, so also is the upheaval of land above water, throughout the earth.

Still another portion of this meteor struck an Arab town in Northern Africa and here the upheaval took place around the spot and the earth spurted into the air in form of two *mountains* on each side of the cavity and collapsed into it, leav-

ing the earth comparatively level. The earth always moves upward around the spot and thence off into waves. In laminated or stratified rock it rises up at the sides and one end and so remains, forming a crater lake or crater of elevation, while at the end where the angularly falling body passes underneath the earth, it sinks down over the cavity and at one end lakes are often low and marshy, the other sides and end being higher and retaining more perfectly the circular form of the cavity as made.

Sometimes the body melts and a small volcanic island rises at or nearest this low end; such are found in Mono, Crater Lake, etc.

These volcanoes are numerous in craters of the moon, where, as in many cases on the earth, Mr. Proctor finds the craters to be related, in clusters, this occurring where a number of bodies have fallen at the same time, from the same direction, their high sides and ends and low ends of the cavities all being parallel with each other. In Lakes Harriet and Calhoun in Minneapolis and Red Lakes at the north, in Minnesota, are such, this same parallelism is to be noted upon Jupiter as well when a number of oval spots come like "a string of beads" the foci of the elipses are always parallel.

This condition is best shown upon the earth in the fiords, which are great canals ploughed across the surface by bodies falling tangentally, as if they were shot at the full moon and struck across its edge.

Isle Royale is an island about fifty miles long and perhaps six wide, in Lake Superior. It is formed of solid igneous rock and has been carved in grooves, from one end to the other. At the easterly end the rounded ridges between the canals (fiords) that open into the lake are called "the fingers," the canals being perfectly straight, as if laid out by an engineer, their sides straight and regular, and the broken, angular debris lies along the sides underneath the water, the canals being a block in width and the ridges a little wider and these long, straight narrow troughs are perhaps ten miles long and one can look up through them as far as the level permits and a large vessel may pass up for miles until they become shallow, all gradually deepening to the east in each instance; they are all parallel with each other, as are the elongated fiord lakes in the interior, and all retain their original forms, but where fiords are numerous, as in Scotland or Norway, those formed latest have disrupted and broken up the earlier ones—a condition found in all lacustine regions.

The great valley of the Lunar Alps upon the moon is such

a tangental carving, Saguenay, Chelan and the lakes of Central New York are so related. The only large one formed during historical times is known as Lake Asphaltite or the Dead Sea, a valley nearly sixty miles in length by about eight wide; it is perfectly straight as formed, only at the south end it has sloughed in on one side, making it irregular in form, at the water level, the water at this end having no depth, and thence it gradually deepens for about forty-five miles to the other end, where it is two thousand feet deep; here the body passed underneath. A black carbonaceous rock, not found elsewhere, lies along its banks and its waters are filled with materials that spectrum analysis finds in comets and which are in all newly formed lakes, but where they have outlets these soon flow off in solution.

Large meteors that fall tangentally may be seen, like aerolites, and the Bible and cotemporaneous historians tell us this sea was formed by "fire from heaven during a great earthquake." They are rarely seen when falling vertically, as, it is not known what causes the disturbance, though at Melfi and in other cases they have been seen, and here a long, narrow, swiftly forming cloud struck with the crash of an earthquake, as described. Aristotle and others claimed that the Oval Bay of Corrinth was formed and the beautiful cities of Bura and Helice destroyed, by a great blazing comet, visible by day. He also refers to the long, narrow cloud.

In 1859 one was seen to strike the sun, but as will be shown, they are rarely visible and unless upon rock areas the cavities close; one such is described in the Bible also, and Josephus says of it: "Moses had been talking to the recalcitrant and idolatrous ones with tears in his eyes, when suddenly there came an earthquake and the earth opened and swallowed up some ten thousand of them and then closed as if nothing had happened." This instance will be familiar with many, but what could have happened here? The earth could not have pushed these people into the chasm; it went down beneath their feet, with them—a common condition with earthquakes. These cavities are formed in the fraction of a second and close first from pressure far below and the lower strata may carry the surface with it, or under the tremendous force of the blow the earth seems in some cases to be rendered elastic and it closes with a snap. Mr. Lyell says at Calabria, where so many were left open and formed lakes, that in one instance some buildings were dug out and were found to be crushed flat.

Six out of ten chasms close, the narrow crevices that open at the *apex of* earthwaves always and the chasm may close at one

side, forming an elbow lake, or a star-shaped series of crevices, radiating from a center, may remain as shown by Mr. Lyell, or the sides move in, leaving a long deep chasm. In alluvium large bodies may leave a shallow cavity into which the surrounding surface slides with all upon it, as at New Madrid and Cutch.

When composed of inflammable materials a crater is formed from out of which a volcano rises, as at Vesuvius, and one rose from a lake in Nicaragua, a few years ago.

Many substances are found upon the ground after a shock, as at New Madrid, a peculiar white powder was found covering everything; ashes, sand, dust, stones, flints are found, as at Charleston. Here also a yellow, sulphurous, viscid mass was found, and in other cases a hair-like fibrous, stony stuff has been picked up in handsfull. It is called Peles Hair, all such substances being found with aerolites as well.

At Ban dai san a solid central mass of rock struck a mountain side and dashed the mountain over four miles, damming up streams, etc. Besides this numbers of great boulders buried themselves in the earth, where it was undisturbed back of the mountain, and when dug out the grass was found adhering to their lower sides; some of them were thirty feet in diameter and buried ten feet deep. At the same time there came a mass of sand that darkened the sky for hours and the people saw it coming afar off, but could not run thirty yards before it was upon them, and the sand stuck in their skins and was so hot that it burned them to death. The sand covered a wide region with loess, burying the surface earth. The trees upon the side of the mountain that remained intact, were denuded of leaves, twigs and even bark, by the tremendous blast of wind, that seems always to come with meteors, though it may not be mentioned, which at the Neapolitan earthquake blew people through the windows of their dwellings.

When these bodies strike mountains or the edge of a table land, they leave their circular impress in the cavity, as no pressure comes from the other side, and at Jamaica a body plowed a groove down the side of a mountain, moving at the same angle.

Impact near a volcano will generally cause an apparent explosion of the volcano by the upthrust, and often the whole effect will be charged to the volcano, as at Ban dai san, Krakatoa, and others, all of which were meteoritic it will be found, as no other theory will account for the conditions, when understood. What has been called a tidal wave flows like the earth *wave from the center of* disturbance, nor was there ever any

explosion known to occur at the place where these waves emanate; the force of the blow at sea may throw the sailors in vessels nearby off their feet, into the air, and the vessel is often left in sinking condition.

These waves are always circular, as if some gigantic pebble had fallen into the sea, and so they are described. The earth-waves often extend over thousands of miles through the earth and when we think of a possible force that could move our solid earth thus, or any possible explanation for any of these conditions, there is no other theory by which to explain any part of it while the present one explains all, as a correct theory should do.

At the Neapolitan earthquake an oval crater shown by Mallet was shot into the solid rock. Mallet says that "among the many lying wonders told" him, was one about this crater. They said, "and it was circumstantially affirmed, that this crater was formed at the time of the shock and that fire was seen to fly out of it at the time." The reader will know that when a steel shell strikes the armor plate, a great flame of fire blazes from the point of impact, and these bodies move fifty times more swiftly than the shell.

Striking tangentally they sometimes throw rocks great distances; they are then called "Erratics," and Mr. Geikie illustrates one that bears every evidence of such origin, as if blasted from its bed, but being scratched with striae during its sudden journey, as it slides over the surface, ice is supposed to have picked it up and carried it there, in some unaccountable manner.

Springs always flow from the spot of impact, though it closes, the lakes always having springs in their beds, which often carry carbon, bitumen, asphalt, iron sodium, phosphorus, sulphur and various soluble substances, from below, and these deposit around the shores of the lake, particularly bitumen and carbon forming peat, and may turn it into a marsh. The iron is harvested periodically from some Swedish lakes, while ebulitions of gas blow holes in the ice above as at Lake Baikal and cause what are known as "Silches" in Switzerland and phosphorescent will-o'-the-wisps, rise from old marshes.

As shown these bodies at times penetrate the earth very deeply and may leave a circular crevice around the spot as at Charleston, though the chasm closed, and here also sulphurous waters flowed out as they usually do for a short time, all the springs in the vicinity becoming suddenly very active while others are cut off.

The bodies come upon certain belts of the earth, that is ninety per cent of them, and these belts are outlined by the spot belts of the sun, those of Jupiter being more narrow, though at the same latitude centrally, as those of the sun and earth.

Great cavities mark the latter spot belts as the belt at Nicaragua may be traced through the Caribean Sea, the Mediterranean, Dead Sea, Black, Caspian, and other great craters in the earth. There is another belt with few cavities that seems to follow the thirty-fifth parallel of latitude across the United States. North of the latter belt only small bodies fall, falling vertically; they were formerly called "thunderbolts," as will be mentioned.

There are many other conditions that might be referred to, but the reader will be able to explain all from what is given.

The direction of the earth-waves signifies little, as they extend eliptically, from one foci of impact, the rock strata, alluvium and especially older cavities, receiving and transmitting the earth-waves in varying degree, the older cavities being disturbed when the intervening area of surface remains intact, the impulse passing through the interior earth.

The waves broaden as do those on water and the time in passing increases as the distance from the epicentrum increases, while near at hand they pass in a few seconds.

Secondary shocks always follow great shocks and meteors may fall, it may be minutes, hours, days, weeks and months after the first one it seems, to the same locality, as will be shown.

There is no relation between the points of impact in the earth, nothing to indicate the earth as their origin in any case.

Secondary and meteoritic shocks may be easily distinguished from the suddenness of the latter near the point of impact.

CHAPTER II.

PHENOMENA ABOVE THE EARTH.

Having described and explained briefly the effects of meteor impact upon the earth, we will now examine, in manner similar, the aerial conditions, that have been presented and described, throughout ages past.

Comets are very rarely seen to strike the earth; earthquakes are caused by certain dark invisible meteors, that are only found by stellar photography and it is the meteors, shooting stars, gases and vapors, that precede, attend and follow *these bodies, with* certain other conditions that are now *to be described.*

Comets are traced in a few cases to nebulae, they are now known to have solid nuclei and during their long journey, to the earth, seem to have accumulated enormous quantities of gas and vapor producing matter, which, as they near the sun, seems to take fire.

Thus, they become visible and are seen to move out to the orbit of some larger planet and pass around this, then they return around the sun and back again and so continuing, during which time they are losing their luminous constituents, becoming more and more dim and faint, and soon wholly disappear, their nuclei forming what Croll and others have termed Dark Matter in Space.

There are several reasons why these bodies, that are attached to our solar system are not visible to the telescope, which finds but few of the more distant stars, as compared to the myriads shown by stellar photography.

The combustion of their vapors must leave them black and we could not see the moon if it were black. These bodies are usually small, though they may be enormous in size, moving at great speed, millions of miles from the earth, and while much of their combustible material may burn, they seem to retain a vast quantity of it that does not combine chemically, and the refraction of light by such gases appears to carry the view around the bodies, a condition that seems to exist with comets.

Save with very large ones, that are seen to have disks, we cannot see the nuclei of comets, yet know a solid or liquid body is there, in a number of ways.

These dark meteors are seen, however, near the sun, during an eclipse and many times near the earth, or crossing the sun's disk and before an earthquake they are seen from time to time, while by night their preceding and following meteors, shooting stars, gases, vapors, fires in the air, and phosphorescent trails, that seem to reach down to the earth from above, like the trail of a shooting star, these in one form or another, where the description is at all complete, are nearly always mentioned, though not generally visible by day, the Catalogue of Mallet containing hundreds of such descriptions.

Comets are often seen to be separated, into a number of bodies, even to divide in mid-space, their fires to go out, when they disappear and they can only be found after this, by stellar photography, and seen only as white streaks upon the photographs; thus these dark bodies have destroyed many a long night's work, on the part of the photographer, but there will *soon be a time* when these photographs will be made for the *streaks alone.*

The coming of these bodies and their frightfully sudden shocks to the earth, is nearly always indicated by visible gases and vapors, unusual meteors and explosions overhead, the vapors appearing first upon the horizon at night and morning and beginning to be noticeable, if looked for, about a month in advance of the oncoming meteor.

They are generally composed of hydrogen, hydrocarbons, etc., and may be detected by smells of petroleum, essential oils, or varying odors, and it is these that produce what is so commonly known as "earthquake weather," an intensely hot, dry condition of the atmosphere, the air becoming stifling and unbrathable, the earth cracking open as described by Von Humboldt at Cumana, a most complete description of aerial conditions, which descriptions are seldom given. (See Personal Narrative.)

As the tail of a comet is seen to be blown away by the magnetic rays of the sun at a speed of fifty millions of miles in a day, a distance requiring the body weeks to pass over, we can understand why a body coming from that direction should have its vapors driven to the earth so long in advance and some vapors being paramagnetic, are drawn toward the sun, it would seem.

These vapors are usually highly inflammable and mixed with air explosive, and as they concentrate at the point of impact, slight explosions are often heard overhead, some time in advance, while at the time tremendous explosions are produced. (See Neapolitan Earthquake.)

The phenomena of aerolites, as described, will be found with earthquakes, also, viz: The preceding peculiar weather, obscuration of the sky, darkness, a cloud that fixes itself over the spot in advance, smells in the air, stench of sulphur after the body falls, ashes, dust, stones, a yellow viscid matter smelling strongly of sulphur, Peles Hair and other substances found upon the ground. The various explosive sounds, as of geese cackling far above, wagons drawn swiftly over a stony road, frightful explosions at the time likened with both, to a thousand cannon, hissing, rattling of stones, a bellowing of cattle sound, due to concave stones driven at great speed through the air, with other coincident conditions, some being rare, but mentioned with both, while others are witnessed over and over again with both aerolites and earthquakes.

From a comparative study of the two, the writer will state that no conditions are found with aerolites that are not duplicated in earthquake phenomena, but many are mentioned with *the latter that are not* with aerolites. Aerolites often produce

considerable shocks and their explosions are mistaken for earthquakes.

As to the evidence of the presence and effects of these invisible bodies, it is simply limitless, as shown in hundreds of coincident conditions and these wholly aside from the phenomena of earthquakes. All conditions of the earth, the spots, heat, light and peculiar conditions of the sun, the spots upon Jupiter and other planets, moon conditions, the universe of nebulae and stars, everything in connection with them is simply and adequately explained by predicating such impacts.

The comet-meteor is the supreme force that actuates all.

This is not a hypothesis merely, or theory, but a condition that embodies numberless theories, that the writer not only think he knows, but knows that he knows; it is something that the physicist will quickly discover to be of intense interest and importance and the specialist in science, with every other that assumes to keep abreast with such knowledge, must devote himself to the study of this phenomena, and what is told herein will take him over the rough places of his inquiry.

None can escape the truth of what is here claimed, as the origin of such phenomena, for instance, if there be a million of comets, more or less, as claimed, that belong to the solar system, and these known to be breaking up and segregating and crossing the path of the earth, must they not strike it? That they cannot be seen in space, which is dark, and but rarely in crossing our narrow belt of atmosphere, at such speed, disproves nothing, taken with the thousand coincident conditions, otherwise unaccountable, as circumstantial and direct proof.

Though nothing within the limits of a volume would explain all the writer has in mind, yet he sincerely trusts that those competent will give it the attention it deserves and will aid in further observations, which though briefly are correctly outlined.

To resume, the writer will state that there are some matters that require further study, one of which is the question which is not settled, in his mind, as to earthquake belts. Now these shocks do not come at all in the northern portion of the United States. Many of them center on the thirty-fifth parallel of latitude and another belt passes through Central America, the Caribean Sea, Mediterranean, and thence across Asia, and there are other belts south of the equator where the earth is mostly covered by water and the shocks only evidenced by sea waves.

We find the spot belts of the sun and Jupiter located at *similar latitudes*, Jupiter's being more narrow than those of the

sun, owing to the inclination of the sun's axis, while that of the earth is still greater than that of the sun and the earth spots necessarily more widely distributed along lines of latitude, but why these apparent belts upon the earth within the great belt? Between the thirty-fifth parallel and the great belt south there are very few shocks, and north of the thirty-fifth parallel only small bodies fall, this belt being about five degrees in width, which seems to be about the width of the others, for large bodies do not fall outside of these belts, that is, not more than ten per cent of them, it will be found. They seem to follow certain isodynamic lines of magnetism, the writer has observed, yet the planets to which they are attached surely regulate their periods, and places of falling it may be. The shocks at New Madrid, Calabria and Lisbon came twenty-eight years apart, on the same belt, and were followed by the same peculiar white dry phosphorescent fog, all being very large and with little doubt were attached to the orbit of Saturn, the meteors making their orbits in a little less time than the planets, as shown in the spot periods of the sun.

Again, not only the preceding vapors, but the bodies themselves will fall near some fixed meridian, as at Calabria; it may be months after each other and we find at Cumana, a cloud that fixes itself at the point of impact at noon and thence gradually extending itself vertically into the sky as far as the eye can reach, increasing up to four o'clock, the time of the shock, when it disperses. Now why should this cloud coming from a cosmical body out of space, and there will be found no question as to this—why does this cloud not extend four thousand miles around the earth with its rotation?

We find the same condition taking place with aerolites. (See Meteors, Cosmos.) The bodies do not always follow to the same meridian, but mostly distribute themselves around the earth, and the vapors may also sometimes.

The vapors may explode at a distance as at Riobamba, four hundred miles distant, where a tremendous explosion came overhead, none being heard at all at the place of impact, but nearly always the explosion comes at the epicentrum. At Elsis, where the great stone fall occurred, just after the French Academy had announced that no stones ever fell from the sky, the cloud was seen to disappear in sections as each successive explosion came, showing that the stones followed the cloud and that the cloud, not the stones, explode.

An hour or two before the shock, as at Lisbon and the day *preceding New Madrid*, a much deeper obscurity comes from *hydrocarbon vapors*, though it must be remembered that no two

earthquakes present the same conditions; one body will be composed mostly of carbon, the other of silicon, and their vapors vary in considerable degree also.

Some are of sand, others loose stones, and others a compact mass of rock, iron, or a wet, slushy mixture may fall, as at Riobamba, here composed of carbon and silex, called "Moya."

Volcanoes are peculiarly subject to these vapors, and if upon the same belt or near or far from the point, they may become active, as at Krakatoa, where the vapors took fire before the shock, covering a wide region, the final explosion extending far out over the Indian Ocean, where one of the three bodies seems to have fallen.

With smaller bodies at times the vapors seem to follow its path in a narrow stream and they take fire as they come into the air and burn at one spot in the sky, in form of a star, sword, dragon, etc., as described.

A terrific hurricane is of frequent occurrence where a large stream of vapor follows the body, as at St. Thomas. (See Boscowitz for many descriptions of phenomena.)

The electrical conditions are necessarily frightful, in many instances, and they extend over many degrees of latitude and the entire season following is often cold and wet with frequent severe storms, rain falling in desert regions this seeming to be due to the large quantity of moisture produced by the combination of hydrogen with the oxygen of the atmosphere, and at other times the body seems to be composed largely of water, which falls in masses.

The earth's axis appears to have been disturbed at the time of Krakatoa, and perturbations and aberations of cosmical bodies are produced by this interference, and it was during an examination into the causes of these effects, that the writer discovered the origin of earthquakes, some fifteen years since.

A tremendous blast of wind is felt near the point of impact when the body falls, as would be supposed, which at Bandaisan stripped leaves from the trees, and at the Neapolitan blew people through the windows of their dwellings. This wind is preceded by a dead calm at the spot and the barometer which is much affected by the oncoming vapors, lowers up to the very time of the shock.

While they greatly obscure the sky and sun, as before New Madrid, it is rare that absolute darkness is produced, as at Bandaisan, the Crucifixion, and others, or when stones fall, as at Crema.

There are a numerous class of smaller bodies that cause *slight shocks* north of the great belts; such an one fell near

Oxford Junction, in Iowa, a few years ago and one at Fairmount Park, shaking New York, when both buried themselves more than 100 feet in the earth. These were formerly called "thunderbolts."

They fall in England, of which many accounts are found in older publications of the Royal Society, sometimes leaving a cavity a few feet in diameter; they are often classed as earthquakes.

These vapors cause the drying up of springs, but as springs are not well understood, the subject, like many others touched upon, would require a chapter in explanation.

Large bodies, it will be understood, are not drawn in by the earth's attraction, except in slight degree, but pass on into space, and what are known as detonating fireballs may be assumed to be larger than aerolites. The "thunderbolts" belong to this class, though very small bodies may fall vertically, and often do.

The force with which large meteors strike is amazing in many ways. At Mendoza a large red and blue meteor was seen moving as the sun moves, but really toward the earth, far distant; the next night a large mountain, it seems some seventy-five miles distant, was driven into the earth and in four seconds, according to Boscowitz, there was nothing left standing three feet high in Mendoza, a town of fifteen or twenty thousand people, and four-fifths of its people were buried or dead; at the same time a town 350 miles further distant was left in ruins.

What force could there be in the earth to cause such conditions? There was no explosion here of a volcano, nor cave, for there are no deep caves in the earth, as may be proven. There is just one imaginable force that could cause such effect.

There are many other conditions that might be noted, perhaps, that mark the presence of the meteor, which at present are mistaken for volcanic eruptions, especially when volcanic activity precedes the coming meteor; then the impact gives a tremendous upthrust to the interior of the volcano, and it seems to explode, and the ashes, stones, liquids and vapors that come with the meteor are thought to come from the mountain.

When the volcanic activity arises from inflamable vapors the activity at first seems to be spasmodic or paroxysmal, and periodical explosions occur, as the products of combustion clear away.

The ashes or other material of the meteor are filled with inflamable matter in some cases, and set on fire by heat of impact on the air; they burn everything they fall upon, and flames fill the air with many earthquakes. This aside from the burn-

ing gases far above, that do not often descend to the earth.

At Cutch, Bandaisan and others, the fire came near the earth, but this, like many other aerial conditions, being unaccountable, is often omitted in accounts. The aerial conditions being much more difficult to get than those of the earth, through ignorance of its source.

CHAPTER III.

THE STUDY OF EARTHQUAKE PHENOMENA.

Mr. Geikie, the greatest of text writers upon geology, says of Plutonic earthquakes, "The origin of this sudden blow can only be conjectured," and well may this be said, for since the Principles of Lyell, who refused to treat upon aerial conditions as not belonging to geology, they have been totally ignored by geologists, as well as the more unaccountable conditions upon the earth. The seismologist seems to be chiefly engaged in the quest of earth-waves, nor does astronomy attempt to deal with conditions between the earth and sky. No one knows very much about the phenomena of earthquakes therefore, though Lyell expressly admits these aerial conditions to exist.

This region between heaven and earth, presents most amazing conditions, some that cannot be referred to here. It is a no man's land, as it were. Finding little or nothing in modern works on the subject, in order to get acquainted with earthquake phenomena, we are forced to go back to the Catalogue of Mallet, published only in the British Association Reports, which also contain a catalogue of meteors, and to continental writers, from whom we have an indifferent translation of Boscowitz' "Earthquakes," from the French. A careful reading of these two, however, should satisfy the thoughtful reader as to the truth of what is herein affirmed. One may need to read from the citations in the catalogue of Mallet, as he omits much meteoritic phenomena, but one must read the catalogue to know anything of earthquakes.

The most perfect observation of aerial conditions was made by Von Humboldt at Cumana, which should be read with others, though he knew nothing of, nor does he mention, the falling body here.

Conditions of the earth are partly described in the Principles of Geology, by Lyell, though the whole history of this phenomena should be written at once by one who has learned the origin, and has studied it somewhat. Vol. 10 of the Harleian Miscellany contains a description of Catania, by Father Zurcher, that is excellent.

Read some accounts also of Jamaica, 1683, and of New *Madrid, Mo.,* in 1811, and as many as possible of the latter,

for there will be something new in each. Read Nature, Scientific American and Milne's Seismological Journal upon Ban dai san, Nature upon Charleston, 1886; Ban dai san in 1889, the accounts coming soon after. Read also Mallet's Neapolitan Earthquake, with the Appendix. You will now have learned something of the phenomena and origin of earthquakes.

As the heavy hydrocarbon vapors seem to settle in the lofty craters of volcanoes and set them originally into a spasmodic activity, and the meteor shocks them into a violent outburst, you will find many earthquakes complicated with volcanic phenomena, and more or less difficulty in distinguishing between the two, especially as the vapors set up their action before the meteor arrives.

Ban dai san, mistakenly termed a volcanic eruption, in the Indices, presented no volcanic phenomena whatever. The entire volcanic activity at Krakatoa was due to vapors and upthrusts when the mounttain was driven into the earth, twelve other mountains uprising at the time. Vapors, explosions, etc., attending both earthquakes and aerolites, form a very pretty comparative study.

At Catania there was thrown down a number of large bodies, at New Madrid and Lisbon also, at Jamaica a perfect shower of smaller ones, at Ban dai san, sand, boulders and a large core of rock fell.

Never be content with one account, if more are to be had, as no two are ever alike, or contain the same facts, and remember that no writer or describer has the slightest suspicion of what actually takes place, so you cannot depend on his inferences or opinions. No one will tell you what causes this phenomena.

The earth, and moon as well, are literally filled with conditions produced by meteor impact, and the sun and planets form complete studies of themselves, and as you follow the subject you will from time to time run upon conditions that are new and not known to exist, that are most interesting.

In every science touched upon, the professor will have to learn his lesson all over and take up new fields, or he will surely fall behind in knowledge, and he who learns the truth soonest, and follows it out, will precede others, and this is a subject only bounded by the Universe; it has no limitations.

Many new problems will arise, as well as new discoveries, and the writer will put forth his best efforts in aiding others, yet this little pamphlet puts you behind the curtain, takes you over and across places that he was years in reaching, and as *you read upon phenomena* you should have this explanation by

you, and you may need to study it, as it is too concise, in fact.

Read such writers as Von Humboldt and Darwin, in Cosmos and the Journal, and all good describers and observers of phenomena; do not be afraid of old accounts; read Aristotle and even Pliny, selecting of course your topics. There are works in other languages to be read, that will be cited by Mallet, but as soon as familiarized with earthquake phenomena one will come upon other conditions that will take his attention. This discovery, for instance, brings geology and astronomy together, and this dark matter presents a new and wide field for the astronomer, and certain new investigations of the greatest importance. It is my opinion that it must bring all sciences involved, more and more, into necessary knowledge.

While no great amount of time need be spent in learning the origin of earthquakes, and knowing it beyond question, there are an hundred other conditions that present themselves, that are in some cases difficult and in truth, you are confronted with a whole education, that must add very considerable to the extent of scientific study, as now taught, for it is an entire science in itself, as extensive as either geology or astronomy; it will add a new chair even to medicine and theology, as will be found.

If the reader will inform me when he shall have investigated the origin of earthquakes, to his satisfaction, I will furnish him something more that will be new and surprising, and it will be desirable to form a scattered school of observers and investigators on various parts of the earth, for accurate observations, so imperatively demanded, especially along the earthquake belts, where they become highly important.

In this behest the writer has it in mind, to get out a series of pamphlets, of about the size of this, to cover certain special lines of investigation, that he has followed out, relating both to earthquakes and other conditions, which should be new, true and interesting not only to instructors and students, but to all lovers of phenomena, as he always avoids scientific terms where practical, or possible even, as so many twaddlers conceal ignorance by the use of polysyllables.

Should a demand for such pamphlets arise he would get them out at once, to the number of a half dozen, not valuable as books perhaps, but for the information they convey, something that is actually "new under the sun." They would be sold for one dollar each, or five dollars for the set, if ordered at once.

This would aid in furnishing means for carrying on such observations also and results aimed at by the writer, to complete *this knowledge* as soon as possible, by further careful

study and observation, for the matter requires more work than the reader can possibly imagine and will still require years in accomplishment.

There is so much to be investigated that cannot be learned from books, so much above and upon the earth, so many new and unknown conditions, many of which are now known to the writer, however, that no individual person can alone deal much further with the matter than I have to date, though sorely wanting means.

No complete bibliography will be attempted at this time, for several reasons, nor will the reader require one, the Catalogue of Mallet being in years 1850 to 1858 of the British Association Reports, and Boscowitz being all that should be required to satisfy a reasoning person, who avoids the theories and inferences of modern writers, Cumana in Vol. 3 of the Personal Narrative; Ban dai san, in Vol. 6 of the Seismological Journal, and others cited.

CHAPTER IV.
HOW TO REASON ON THESE THINGS.

From the citations given an enormous amount of evidence of conditions may be found, with the citations found in the Catalogue. Very little of this evidence, if there be found none contrary, should amount to positive proof to the reasoner.

Though dealing with gigantic forces, only practical common sense and experience is necessary to arrive at a conclusion.

Let us take a few well-known conditions, as some of the effects at Lisbon. What could have produced that hole, nearly a half mile in depth? Why did the wharf and people disappear so suddenly? Did the earth sink down? Was there a cave there? What roofed it over when granite is crushed to powder at a depth of two or three miles? Why, then, did the lake bed near by rise upward at the same time? What pushed it up? If there was an explosion, why does nothing ever blow out of these cavities? Why was the cavity circular, the water forming a vortex? Why did no hat, oar or boat ever rise to the surface?

What lifted the waters of Lake Ontario and all Europe at this time or set them in motion? What force in the earth could violently shake 4,000,000 square miles of earth at one time? If explosive, why does it never reach the surface? What is it like?

What caused the sea wave sixty feet high? What sudden shock upon the water alone threw the sailors a foot or more, off the decks of vessels, near the point from whence this sea wave *emanated*, nearly sinking the vessels when nothing but water *touched them?* What happened here?

Again: How are lakes, fiords, bosses, crater-lakes, craters of elevation, craters of the moon, spots upon Jupiter and the sun formed?

Did you ever know any one to explain one of these rationally?

Again: Take the oval crater illustrated by Mallet in his Neapolitan Earthquake, Vol. 2. He states it was "circumstantially affirmed" that it was made during the earthquake. What could form it?

Why did fire fly from it at the time as the flame bursts out when a steel shell strikes the armor plate?

Not these things only, but what could produce all the wonderful aerial conditions mentioned by Mallet and Boscowitz? One might fill pages with them. From your own experience, can you explain any one of them? What positively answers each and every one of them as shown herein? The meteor comet, with its attendant vapors.

Do such coincidences prove anything to your mind?

Suppose you knew only one man existed, who was strong enough to pull up trees, to tip over a house, to move a church, to throw a rock weighing a ton, all so quickly you could not see him do it?

That these things were done, and you knew they could not possibly be done in any other way? Would you regard that as proof that he did it, if you had other reasons for believing him present at the time? There are hundreds of such coincident conditions, all combining and not one break in the chain, that I have ever found. Every well-preserved lake valley bears typical marks of meteor impact, as plainly as foot-prints in the snow. Meteors are associated with earthquakes in, not one or two only, but in hundreds of instances, though they can only be seen at night usually. Is not this direct evidence?

When you have familiarized yourself with these tremendous forces you cannot fail to comprehend the meaning of such evidence.

Many have confounded the secondary shocks due to heat of impact and gradual dissolution of the body, in the earth, with meteor shocks. They are often numerous right after or during impacts, or they may start up weeks, months or years after, in one movement, or a number, but they move slowly, and present no phenomena, as compared with meteor. A slight shock may, and often is, due to a meteor. Volcanic tremblings and movements of adjustment, are easily distinguished from true *impacts, when* understood.

FINALE.

It can be said, by way of metaphor, that this comet-meteor so strangely hidden, throughout ages past, is not only the Supreme Force, but it is the Key that unlocks all mysteries; that of air and water and fire, of heat, life and electricity; it gives the vibrant thrill of sentience to living things, nor is it evil.

It is the World, the Sun, the Star-Builder.

Its conditions are the Laws of the Universe. It is the moving Finger of God, that stirs the changing Forms of Matter.

He that shall study its way, and solve its problems, shall be wise, and he that first assures himself of its presence (The Origin of Earthquakes) is upon the way. Is such knowledge not worth the effort?

If the student, when he becomes satisfied that I am right, will kindly inform me I shall be pleased to put him in the way of other new and remarkable discoveries, for I first discovered this thing, many years ago, and have not been wholly idle.

Respectfully yours,

GEORGE WALTER HALE,
Deadwood, South Dakota, U. S. A.

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